RESEARCH PAPER

Sociodemographic and psychosocial correlates of smoking-induced deprivation and its effect on quitting: findings from the International Tobacco Control Policy Evaluation Survey

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Aims: To determine the prevalence and characteristics of smokers who experience smoking-induced deprivation (SID), and to examine its effect on quit attempts, relapse and cessation.
Methods: Waves 2 and 3 (2003–5) of the International Tobacco Control Policy Evaluation Survey were used, which is a prospective study of a cohort of smokers in the US, Canada, UK and Australia. SID was measured with the question ''In the last six months, have you spent money on cigarettes that you knew would be better spent on household essentials like food?'' A total of 7802 smokers participated in the survey in wave 2, of whom 5408 were also interviewed in wave 3.
Findings: The proportion of smokers who reported SID was highest in Australia (33%) and lowest in the UK (20%). Younger age, minority status and low income were associated with a higher probability of SID. Some of the other factors related to a higher probability of SID were higher level of nicotine dependence, having an intention to quit, and smoking to help one socialise or control weight. The relationship between SID and quit attempt was mediated by having an intention to quit and worrying that smoking would damage health and reduce the quality of life. The relationship between SID and relapse was mediated by perceived stress. SID was not associated with successful cessation.
Conclusions: Many smokers experience deprivation that is the result of their smoking. Strategies to reduce the prevalence of smoking probably effect a general improvement in standards of living and reduction in deprivation.

The relationship between socioeconomic status and smoking is well established, with lower socioeconomic groups having a markedly higher prevalence of smoking in developed and many developing countries.[1–4] In addition to the common measures of socioeconomic status such as education and occupation, smoking has also been associated with direct indicators of deprivation such as financial stress. Marsh and McKay's[5] study on low-income British families found that smoking was a strong predictor of financial hardship (experiencing financial anxiety, being in debt and being unable to afford consumer items such as food and clothing), independently of a lack of educational qualifications, low income, manual work, claiming welfare benefits and social tenancy. Similarly, Siahpush et al[6] found that in Australia, households reporting tobacco expenditure were more likely to experience financial stress (measured by indicators such as being unable to afford meals or heat the home owing to shortage of money), after controlling for several indicators of socioeconomic status and demographic factors. Finally, Efroymson et al[7] reported that in Bangladesh, tobacco expenditure exacerbates the effects of poverty and causes substantial deterioration in living standards among the poor.

In the general population, there is a relationship between socioeconomic status, deprivation and being a smoker, and also among smokers, between socioeconomic status, amount smoked and deprivation. Siahpush[8] reported that in Australia, smoking households headed by people with lower education and occupation spent more money on tobacco. He also showed that households with lower income were more likely to spend a higher percentage of their total household income on tobacco. Furthermore, Siahpush et al[6] found that, among smoking households, a higher percentage of total household expenditure on tobacco was associated with several indexes of financial stress.

Several qualitative studies also document the connection between smoking and deprivation. Bancroft et al,[9] in a study on smokers from two socially disadvantaged areas in Scotland, reported that smoking was closely associated with dealing with difficult and stressful aspects of daily lives, as well as with boredom due to a lack of alternative activities. Similarly, Copeland[10] studied a group of women from an economically and socially disadvantaged area in northwest Edinburgh and found that the pivotal role of smoking in their lives was that of a coping mechanism, particularly in response to problems such as financial stress, divorce, bereavement and worries about children. Finally, Stead et al's[11] research undertaken in disadvantaged communities in Glasgow suggested that lack of resources, a stressful environment, strong pro-smoking community norms and limited opportunities for recreation seem to foster smoking and discourage cessation.

The correlational and qualitative studies cited above provide only partial evidence that smoking results in deprivation. We know of no previous studies that use indicators of smoking-induced deprivation (SID) such as a smoker's direct report about spending money on cigarettes that should otherwise have been spent on essentials such as food. The International Tobacco Control Policy Evaluation Survey (ITCPES) provides such an indicator. Our aim was to determine the extent to which smokers experience SID, to investigate the sociodemographic and psychosocial characteristics of smokers who experience SID and to examine its effect on quit attempts, relapse and cessation, in the US, Canada, UK and Australia by using this indicator.

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Abbreviations: HSI, Heaviness of Smoking Index; ITCPES, International Tobacco Control Policy Evaluation Survey; SID, smoking-induced deprivation

METHODS
Sample and design
Data were obtained from waves 2 (2003) and 3 (2004–5) of the ITCPES. A detailed description of the survey method can be found elsewhere[12] (also see http://www.itcproject.org). ITCPES is a prospective cohort study designed to evaluate the psychosocial and behavioural impact of key national-level tobacco-control policies enacted in the US, Canada, UK and Australia. All aspects of the study protocol and survey measures are standardised across the four countries. Data collection is based on telephone interviews of a probability sample of smokers. Of the 7802 (approximately equal numbers from each of the four countries) current smokers who participated in wave 2, 5408 also participated in wave 3. The attrition rate was lowest in Australia (26%) and highest in the US (41%).

The analysis of SID predictors used data from wave 2 only and included all current smokers in wave 2 (n = 7802). These included 6129 respondents recruited at wave 1 and 1673 recruited at wave 2. In the remaining analyses, covariates were measured at wave 2 and outcomes at wave 3. The analyses pertaining to the effect of SID on quit attempts and cessation were performed on the sample of current smokers in wave 2 who also participated in wave 3 (n = 5408). The analysis pertaining to the effect of SID on relapse included the subsample of current smokers in wave 2 who reported in wave 3 that they had made a quit attempt (n = 2198). We did not use the wave 1 survey because it did not include information on perceived stress, which is a strong correlate of SID (as shown below).

Outcomes
SID was measured with the question, ''In the last six months, have you spent money on cigarettes that you knew would be better spent on household essentials like food? Yes/No''. We pre-tested this question in each of the four countries, and found no evidence that there were differences in meaning. However, this did not involve in-depth cognitive testing of the question. The fact that there were no country interactions in predictors of SID, as shown below, also supports a common meaning. We also note that the correlation between SID measured in waves 2 and 3 was 0.41, indicating moderate reliability.

A current smoker was defined as one who had smoked at least 100 cigarettes in their lifetime and is currently smoking on at least a monthly basis. A respondent was defined as one who had made a quit attempt in wave 3 if they responded affirmatively to the question, ''Have you made any attempts to stop smoking since we last talked with you (month of last interview)?'' Successful smoking cessation was defined as a current smoker at wave 2 who now reports smoking on a less than monthly basis in wave 3 based on the following questions: ''The last time we spoke to you (month) you said that you smoked (daily/weekly/monthly). Do you still smoke (daily/weekly/monthly)?'' Those who indicated otherwise were then asked whether they are now smoking daily, less than daily but at least once a week, less than once a week but at least once a month or less than once a month. Those who reported that they smoked less than once a month were defined as quitters in wave 3. Respondents who made a quit attempt but were still a current smoker in wave 3 were regarded as having relapsed.

Covariates
The sociodemographic covariates were sex, age, minority group status, education, income and country. We used the primary means of identifying minorities used in official surveys conducted in each nation, and this was racial/ethnic group (US, Canada and UK) and language other than English spoken at home (Australia). Respondents were classified as being in the minority group if they were non-white (US, Canada and UK) or did not speak English at home (Australia). Level of education consisted of three categories: high school diploma or lower; technical, trade school, community college, or some university; and university degree. Annual income was categorised into ''<\$30 000'', ''\$30 000–59 999'', and ''≥\$60 000'' for the US, Canadian and Australian samples. For the UK sample, we used the following categories: ''≤£15 000'', ''£15 001–30 000'' and ''≥£30 001''.

Given the paucity of literature on behavioural and psychosocial correlates of SID, we adopted an exploratory approach and examined the effect of relevant variables and constructs that are regarded in the ITCPES theoretical framework to be important distal or proximal predictors of cessation, and mediate the effect of policy on smoking-related behaviour.[13] These are heaviness of smoking, intention to quit, self-efficacy to quit, functional values of smoking, thoughts about smoking, future orientation, perceived stress and number of friends who smoke.

Nicotine dependence was measured using the Heaviness of Smoking Index (HSI), a short form of the Fagerstrom Tolerance Questionnaire.[14–16] HSI scores range from 0 to 6 and are calculated by summing the points for time to first cigarette smoked after waking (in minutes) and number of cigarettes smoked per day. Time to first cigarette smoked is scored: <5 min, 3 points; 6–30 min, 2 points; 31–60 min, 1 point; and >60 min, 0 points. Respondents were asked ''On average, how many cigarettes do you smoke each day, including both factory-made and roll-your own cigarettes?'' Cigarettes per day is scored: 1–10, 0 point; 11–20, 1 points; 21–30, 2 points and >31, 3 points. Higher HSI scores indicate more dependence on nicotine.

Intention to quit was measured with the question ''Are you planning to quit smoking: within the next month? Within the next 6 months? Sometime in the future, beyond 6 months? Or not planning to quit.'' Those who were not planning to quit were distinguished from others. Self-efficacy was measured with the question ''If you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed? Not at all sure, slightly sure, moderately sure, very sure or extremely sure''. Respondents who said ''not at all sure'' were distinguished from others.

Six questionnaire items represented the functional values of smoking, which are among the commonly reported reasons for smoking[17–19]: ''Smoking makes it easier for you to socialize''; ''Smoking helps you control your weight''; ''You enjoy smoking too much to give it up''; ''Smoking helps you concentrate better''; ''Smoking calms you down when you are stressed or upset''; and ''Smoking is an important part of your life.'' The response options were: strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. Respondents who strongly agreed or agreed were distinguished from others.

Three questionnaire items represented thoughts about smoking. Respondents were asked how often they had the following thoughts in the last month: ''Think about the harm your smoking might be doing to you''; ''Think about the danger or other bad things about smoking''; and ''Think about how much you enjoy smoking''. The response options were never, rarely, sometimes, often and very often. Respondents who replied often or very often were distinguished from others. Future orientation was measured with a single item from the Fong and Hall Time Perspective Questionnaire: ''You spend a lot of time thinking about how what you do today will affect your life in the future.''[20] The response options were: strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. Respondents who strongly agreed or agreed were distinguished from others.

Perceived stress was measured by summing responses to four items from the perceived stress scale developed for telephone interviews[21]: "In the last six months, how often have you felt (a) that you were unable to control the important things in your life? (b) difficulties were piling up so high that you could not overcome them? (c) that things were going your way? (d) confident about your ability to handle your personal problems?" The response options were scored from 1 "never" to 5 "very often," with items (c) and (d) reverse scored. The values of the scale range from 4 to 20, with high scores representing high levels of stress. Finally, respondents were asked to indicate, "Of the five closest friends or acquaintances that you spend time with on a regular basis, how many of them are smokers?"

Analysis

We used Stata V.8 for all analyses. Analyses were performed on cases with valid values for all variables. In most instances, missing values comprised a small proportion of the total number of observations. The variable with the largest number of missing values (7.2%) was income. We performed additional analyses where a dummy indicator for the missing category of income was included. The results were essentially the same as what is reported in this article.

As described above, most of the variables with a five-item response scale were presented as dichotomous covariates, for ease of presentation and interpretation. Analyses not shown here revealed that such dichotomisation resulted in essentially the same findings.

The ITCPES team has developed models for predicting quit attempts, relapse and successful cessation, using the waves 1 and 2 data.[22] The models include a set of core variables as follows: age, sex, education, income, minority status, country, HSI, intention to quit, self-efficacy, overall opinion of smoking, outcome expectancy, worries about health and quality of life, favourable attitudes about smoking, tried to quit within last year, longest time off smoking and smoking frequency. We re-estimated these models for waves 2 and 3 and refined them by identifying the variables with small p values ($p < 0.05$). Subsequently, we used the refined models to estimate the adjusted effect of SID. We do not report the details of these model estimations to economise space, and focus solely on the effect of SID.

FINDINGS
The extent and correlates of SID

The distribution of SID was very similar in waves 2 and 3. As table 1 shows, the prevalence of SID in wave 2 was highest in Australia, where 33% of smokers said they spent money on cigarettes that they knew could be better spent on household essentials like food. This was followed by the US and Canada, where 28% of respondents reported SID, with the UK having the lowest prevalence of SID at 20%. Among the groups with particularly high levels of SID were those aged 18–24 years (36%), had a minority status (33%), had lower income (39%), reported that smoking makes socialising easier (33%) and helps control weight (32%), often thought about harms (33%) and dangers (34%) of smoking, and were highly stressed (39%).

Table 2 provides crude and adjusted odds ratios (ORs) for the association of covariates with the probability of SID. Adjusted ORs suggested that younger age, minority status and low income were associated with a higher probability of SID. Country of residence was also associated with SID, with the same pattern as indicated above in the bivariate results of table 1. Smokers who reported a higher level of nicotine dependence and having an intention to quit were more likely to experience SID, as were those who reported that smoking

Table 1 Characteristics of respondents who completed wave 2 of the survey and percentage who reported experiencing smoking-induced deprivation

Covariates	% in sample*	% reporting smoking-induced deprivation*
Sex		
Male	52.8	25.4
Female	47.2	29.8
Age (years)		
18–24	15.1	36.1
25–39	32.3	27.9
40–54	33.9	25.6
>55	18.7	23.1
Minority status		
White/English speaking	86.7	26.7
Non-white/English speaking	13.3	32.7
Education		
Low	53.9	27.4
Medium	34.3	28.8
High	11.8	23.5
Income		
Low	31.5	35.8
Medium	37.7	26.2
High	30.8	21.3
Country		
USA	24.2	28.2
Canada	25.6	28.3
UK	24.7	20.5
Australia	25.4	32.8
Heaviness of Smoking Index†		
0–1	27.0	25.7
2–4	61.5	27.7
5–6	11.5	31.1
Intention to quit		
No intention to quit	27.7	19.7
Intend to quit	72.3	30.5
Self-efficacy to quit		
Low self-efficacy	28.7	27.4
High self-efficacy	71.3	27.6
Functional value of smoking		
Makes socialising easier		
Do not agree	76.4	25.8
Agree	23.6	32.9
Helps control weight		
Do not agree	69.7	25.4
Agree	30.3	32.2
Enjoy too much to give up		
Do not agree	44.2	29.0
Agree	55.8	26.4
Helps concentration		
Do not agree	62.2	27.0
Agree	37.8	28.3
Calms stress		
Do not agree	16.8	23.9
Agree	83.2	28.3
Important part of life		
Do not agree	59.3	26.6
Agree	40.7	28.9
Thoughts about …		
Harm of smoking		
Not often	50.9	21.8
Often	49.1	33.4
Danger of smoking		
Not often	53.5	21.8
Often	46.5	34.0
Enjoyment in smoking		
Not often	63.2	26.4
Often	36.8	29.4
Think a lot about future		
Do not agree	41.9	21.7
Agree	58.1	31.6
Perceived stress†		
4–8	36.8	19.6
9–11	33.1	25.8
12–20	30.1	38.8
Number of friends who smoke†		
0–2	41.1	24.6
3–5	58.9	29.5

*Percentages are based on weighted data. Weights are computed to adjust for number of residential phone lines and number of adult smokers in a household, and to render the age–sex composition of the sample equivalent to the population of smokers within each country.
†These are used as continuous variables in regression analyses.

Table 2 Odds ratios (95% CI) from logistic regression analysis of smoking-induced deprivation on covariates (n = 6829)

	Crude OR	p Value	Adjusted OR	p Value
Sex		0.002		0.315
Male	1.00		1.00	
Female	1.17 (1.06 to 1.29)		0.94 (0.83 to 1.06)	
Age (years)		<0.001		<0.001
18–24	2.03 (1.70 to 2.43)		1.81 (1.45 to 2.26)	
25–39	1.28 (1.11 to 1.48)		1.13 (0.95 to 1.36)	
40–54	1.19 (1.03 to 1.37)		1.05 (0.88 to 1.24)	
>55	1.00		1.00	
Minority status		<0.001		0.003
White/English speaking	1.00		1.00	
Non-white/English speaking	1.41 (1.22 to 1.63)		1.29 (1.09 to 1.53)	
Education		0.033		0.312
Low	1.22 (1.04 to 1.44)		0.93 (0.77 to 1.12)	
Medium	1.23 (1.05 to 1.47)		1.03 (0.85 to 1.25)	
High	1.00		1.00	
Income		<0.001		<0.001
Low	2.01 (1.76 to 2.30)		1.81 (1.55 to 2.12)	
Medium	1.32 (1.16 to 1.51)		1.28 (1.10 to 1.48)	
High	1.00		1.00	
Country		<0.001		<0.001
USA	1.70 (1.46 to 1.98)		1.45 (1.21 to 1.74)	
Canada	1.76 (1.51 to 2.04)		1.48 (1.24 to 1.76)	
UK	1.00		1.00	
Australia	2.09 (1.80 to 2.42)		1.93 (1.63 to 2.29)	
Heaviness of Smoking Index	1.08 (1.04 to 1.11)	<0.001	1.08 (1.04 to 1.13)	<0.001
Intention to quit		<0.001		<0.001
No intention to quit	1.00		1.00	
Intend to quit	1.89 (1.67 to 2.13)		1.40 (1.20 to 1.64)	
Self-efficacy to quit		0.877		0.489
Low self-efficacy	1.00		1.00	
High self-efficacy	0.99 (0.88 to 1.11)		1.05 (0.92 to 1.19)	
Functional value of smoking				
Makes socialising easier		<0.001		0.036
Do not agree	1.00		1.00	
Agree	1.40 (1.25 to 1.57)		1.16 (1.01 to 1.33)	
Helps control weight		<0.001		<0.001
Do not agree	1.00		1.00	
Agree	1.33 (1.19 to 1.48)		1.33 (1.17 to 1.50)	
Enjoy too much to give up		<0.001		0.644
Do not agree	1.00		1.00	
Agree	0.84 (0.76 to 0.93)		0.97 (0.85 to 1.10)	
Helps concentration		0.374		
Do not agree	1.00		1.00	0.768
Agree	1.05 (0.95 to 1.16)		0.98 (0.86 to 1.12)	
Calms stress		<0.001		0.841
Do not agree	1.00		1.00	
Agree	1.26 (1.10 to 1.45)		1.02 (0.86 to 1.20)	
Important part of life		0.027		0.269
Do not agree	1.00		1.00	
Agree	1.12 (1.01 to 1.24)		1.08 (0.94 to 1.23)	
Thoughts about …				
Harm of smoking		<0.001		0.007
Not often	1.00		1.00	
Often	1.87 (1.69 to 2.07)		1.24 (1.06 to 1.46)	
Danger of smoking		<0.001		<0.001
Not often	1.00		1.00	
Often	1.85 (1.68 to 2.05)		1.37 (1.17 to 1.60)	
Enjoyment in smoking		0.001		0.858
Not often	1.00		1.00	
Often	1.19 (1.07 to 1.32)		1.01 (0.89 to 1.15)	
Think a lot about future		<0.001		0.003
Do not agree	1.00		1.00	
Agree	1.67 (1.50 to 1.85)		1.21 (1.07 to 1.37)	
Perceived stress	1.15 (1.13 to 1.17)	p<0.001	1.11 (1.09 to 1.13)	<0.001
Number of friends who smoke	1.10 (1.06 to 1.13)	p<0.001	1.06 (1.02 to 1.10)	0.002

helped them socialise or control their weight, and said that they often thought about the harms or dangers of smoking, indicated that they thought a lot about the future, experienced a higher level of stress and reported that many of their friends smoked. There was no interaction between country and any other covariate.

The effect of SID on quit attempt, relapse and successful cessation

The results in this section pertain to participants who were interviewed in waves 2 and 3 of the survey. Analyses of wave 2 data (not presented here) showed that participants who were lost to follow-up in wave 3 were more likely to have

experienced SID than the rest of the sample. They were also more likely to be men, young and have lower income. The exact effect of attrition on results cannot be assessed. However, by including the correlates of attrition (ie, SID, sex, age and income) in the multivariate analyses, we have reduced bias as much as possible.

Overall, 40.8% of respondents made a serious quit attempt. Among those who reported SID and those who did not, 46.6% and 38.7% made a quit attempt, respectively (p<0.001). However, in the multiple logistic regression analysis with the significant core predictors (age, education, country, intention to quit, worries about health and quality of life, tried to quit within last year and daily smoking), there was little evidence for an effect of SID, with the OR of SID being 0.97 (95% CI 0.84 to 1.12; p = 0.646). Our analysis showed that the effect of SID was fully mediated by two core predictors that were associated with a higher probability of making a quit attempt: having an intention to quit and worrying that smoking would damage health and lower the quality of life in the future.

Among respondents who made a quit attempt, 73.2% relapsed. The relapse rate was 78.9% among those who experienced SID and 70.8% among those who did not (p<0.001). Multiple logistic regression using the significant core predictors (education, income, country, HSI, self-efficacy, outcome expectancy, tried to quit within last year and longest time off smoking) also provided evidence for the effect of SID on relapse, with an OR of 1.3 (95% CI 1.02 to 1.65; p = 0.036). However, when we added perceived stress to the regression, we found that the data no longer provided evidence for an effect of SID, with an OR of 1.22 (95% CI 0.96 to 1.57; p = 0.105).

Overall, 11% of respondents successfully quit smoking. The quit rate was 9.9% among those who experienced SID and 11.4% among those who did not (p = 0.190). In addition, multiple logistic regression analysis using the significant core predictors (age, education, income, country, HSI, intention to quit, tried to quit within last year, longest time off smoking and daily smoking) did not provide evidence of an effect of SID on cessation, with an OR of 0.82 (95% CI 0.66 to 1.03; p = 0.092). However, it should be noted that the size of this effect is moderate and close to achieving statistical significance. Older respondents were generally more likely to quit. The odds of smoking were 36% greater for smokers with a high income than those with a low income. Having an intention to quit sooner (OR 2.85 for "planning to quit within the next month" vs "not planning to quit", with 95% CI 1.96 to 4.14), having tried to quit in the past year (OR 1.28, 95% CI 1.03 to 1.60) and having had a previous quit attempt lasting over 6 months (OR 2.11, 95% CI 1.48 to 3.00) were associated with a higher probability of cessation. Higher levels of nicotine addiction and being a daily smoker were associated with a lower probability of cessation.

DISCUSSION

This paper examined the prevalence and characteristics of smokers who experience SID and investigated its effect on quit attempts, relapse and successful cessation. We measured SID with the question, "In the last six months have you spent money on cigarettes that you knew would be better spent on household essentials like food?" and found that it was most prevalent in Australia (33%), and least prevalent in the UK (20%). The percentage of smokers experiencing SID in the US and Canada was 28%. Country differences remained after adjusting for other covariates. We note that these differences are not due to the amount smoked in each country as the analysis controlled for nicotine dependence, which is an index made up of the number of cigarettes smoked per day and time to first cigarette smoked after waking. It might be argued that

smokers in countries with higher prices of tobacco might have a higher prevalence of SID. However, this argument is not supported by evidence as the UK, with the highest price of tobacco,[23] has the lowest prevalence of SID. It might also be contended that countries with a higher poverty rate have a higher prevalence of SID. There is some evidence for this as the UK has the lowest poverty rate, followed by Canada, Australia and the US.[24] More research is required to further examine the reasons for SID country variations.

In interpreting the findings of this study, it is important to validate our measure as one of SID. Accepting that money spent on tobacco could be better spent on essentials could be an acknowledgement for some that this was money poorly spent, rather than not being able to afford essentials. However, in analyses not reported here, we found that the item was not associated with negative opinion about (or dissatisfaction with) smoking ("What is your overall opinion of smoking"). Our measure of SID was associated with low income and variables such as nicotine dependence and psychological stress, which are known to be strongly related to deprivation.[25] Indeed, we found that some of its effects were strongly related to other indices of stress (see below) as one would expect. Although further research is required to fully validate our measure, the evidence we have shows that it measures an aspect of deprivation. We have work in progress to better understand how it relates to other indicators.

We found no country interaction in predicting SID—that is, the effect of covariates on SID was of the same magnitude across the four countries. We hypothesise that similar association patterns exist in other high-income countries. Lack of a country interaction implies that many targeted tobacco-control policies (eg, targeted to young or low-income smokers) are likely to have a similar result in the four countries in terms of alleviating deprivation among smokers.

Cross-sectional data were used to report the characteristics of smokers who experience SID. The reader should be cautioned about inferring causality and the results should be viewed as a report of partial association of covariates with SID. Some of the associations may in fact imply an effect of SID on a covariate. For example, it is plausible that the experience of SID would lead smokers to become more motivated to quit, to think more frequently about how smoking harms them or to think more often about how smoking could negatively affect their lives in the future. Similarly, although having a stressful life (where one does not perceive oneself to have control over important things in life or is unable to handle personal problems) might lead to SID, it is also plausible that the experience of deprivation might result in stress. In fact, preliminary analysis of the wave 2 and wave 3 data provide evidence of a reciprocal relationship between SID and stress. We intend to examine this and similar issues in future research using ITCPES longitudinal data. Regardless of the direction of causality, the cross-sectional associations can help identify smokers who are more at risk of deprivation.

The experience of SID was associated with a higher probability of making a quit attempt; however, this relationship was fully mediated by having an intention to quit and worrying that smoking would damage health and lower the quality of life in the future. SID was also associated with a higher probability of relapse; however, this association disappeared after we controlled for stress. Thus, although SID and the associated psychological distress can motivate smokers to have an interest in quitting and even make a quit attempt, the stress that may result from the experience of SID may also act as a barrier to successful cessation. Unless we can find ways to ameliorate the stress that is partly caused by SID, we risk a vicious circle of failure. The improvement in economic position from savings

that otherwise would have been spent on tobacco seems to be insufficient in the short to medium term at least to reduce stress sufficiently.

There is increasing evidence that the relationship between deprivation and smoking is likely to be reciprocal. Siahpush and Carlin[26] used longitudinal data from Australia and found that financial stress among smokers was related to a lower probability of subsequent cessation. They also found that ex-smokers who experienced financial stress were more likely to relapse. Similarly, Graham[27] used data from a sample of working-class mothers in the UK and reported that the major reason for relapse after cessation was difficulty coping with everyday problems and stress, including financial stress. Finally, Dorsett and Marsh[28] used longitudinal data from a sample of lone mothers in the UK and concluded that financial hardship was the main barrier to quitting. Thus, in all likelihood, the relationship between smoking and deprivation is circular, such that tobacco expenditure contributes to deprivation, which in turn encourages smoking, impedes cessation and increases risks of relapse.

The fact that such a large number of smokers in each country reported to have spent food money on cigarettes is remarkable. It highlights the addictive nature of nicotine and it also indicates the deleterious effect of smoking on the well-being and basic conditions of life of a substantial segment of the population of smokers. There is overwhelming evidence now that smoking is strongly associated with deprivation, financial stress and a deterioration of standards of living.[6 7] A major part of the financial burden of smoking stems from the fact that smokers are likely to have a myriad of health conditions that diminish the quality of life and standards of living of themselves and their families.[29] The financial dangers of smoking also arise from the fact that smokers are more likely to spend money on gambling and alcohol.[30] Moreover, they are less likely to have private health insurance. This is of considerable importance as smokers are more likely to get ill and thus have more to benefit from having health cover.[30] Thus, campaigns and interventions to reduce the prevalence of smoking are likely to effect a general improvement in standards of living and reduction in deprivation.[31] As such, tobacco control interventions can be viewed as a public policy to ameliorate social disadvantage. For tobacco-control interventions to result in a reduction in disparities in the prevalence of smoking and cessation, they need to target disadvantaged segments of the population or make provisions that universal policies reach and influence these groups. An example of a universal intervention that has had equal success in all socioeconomic groups is anti-smoking television advertising in Australia. Efforts have been made that this intervention reaches lower socioeconomic groups.[32] These include deliberate placement of advertising around television programmes that are more likely to be watched by these groups, and choice of images and messages that resonate with them. Furthermore, the advertising material is pre-tested in focus groups on smokers from lower educational backgrounds. Recent research has shown that, in the period 2001–4, there was no socio-economic variation in the effect on Quitline (a free telephone counselling service) call rates of anti-tobacco television advertising that predominantly featured hard-hitting advertisements on the health risks of smoking, and promotion of the Quitline.[33]

An increase in tobacco excise is recognised as one of the most effective policies for reducing the prevalence of smoking.[34 35] There is also some evidence that smokers from disadvantaged backgrounds are more likely to reduce their cigarette consumption in response to rising tobacco prices.[36] However, given that there is no difference in the cessation rate of smokers who

What this paper adds

- The study provided an estimate of the extent of smoking-induced deprivation (SID) based on the question, ''In the last six months, have you spent money on cigarettes that you knew would be better spent on household essentials like food?''

- The prevalence of SID was highest in Australia, where 33% of smokers replied positively to the above question. It was lowest in the UK (20%). In the US and Canada, 28% of respondents reported SID.

- Younger age, minority status, lower income, higher nicotine dependence and having an intention to quit were associated with a higher probability of SID.

- The relationship between SID and a quit attempt was mediated by having an intention to quit and worrying that smoking would damage health and reduce the quality of life. The relationship between SID and relapse was mediated by perceived stress.

- SID was not associated with successful cessation.

Policy implications

- Many smokers experience deprivation of household essentials, which is the result of their smoking.

- Strategies to reduce the prevalence of smoking are likely to effect a general improvement in the standards of living and reduction in deprivation.

- Tobacco-control interventions can be viewed as a public policy to ameliorate social disadvantage.

experience SID and others (and that smokers with financial stress are less prone to quit[26]), increases in the price of tobacco will worsen the material well-being of those disadvantaged smokers who face financial difficulties and fail to quit smoking. Special programmes may have to be implemented to counter the potentially adverse effects of tobacco price increases for these smokers. They could be provided with effective counselling and advice programmes as well as with subsidised pharmacotherapies such as nicotine replacement therapies and buproprion, which have been shown to increase the success of quit attempts.[37 38] We need to find effective ways to break the vicious circle between deprivation, stress and smoking.

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